Revised: March 5, 1998

NATIONAL WEATHER SERVICE

STATEMENT OF WORK FOR
NOAA WEATHER RADIO (NWR) TRANSMITTERS

Section C.2
Statement of Work

DRAFT

March 10, 1998

Revised: March 5, 1998

Table of Contents

C.2Statement of Work

C.2.1 Scope

The Contractor shall provide radio broadcast transmitters which comply with the specifications detailed in Section C.3 of this contract. Included with this requirements is acceptance and reliability testing (C.2.3), training of personnel to operate and maintain the transmitters (C.2.4), documentation in the form of manuals to be used for system operation, maintenance, and training (C.2.5), reports (C.2.6), and meetings (C.2.7).

At the discretion of the Government, other additional services may be required. The contractor shall provide any or all of the following as optional services: Option 1) Logistics Support, Option 2) Maintenance Services, Option 3) Transmitter Installation Services, and Option 4) Antenna and Transmission Line. All work performed shall be on a “turn-key” basis and shall be in accordance with all local, state, and national codes and ordinances. In some cases, the Contractor may be required to install equipment which will be co-located with other radio equipment already installed and in operation. Work performed will be coordinated with both the Government and the host cooperator to insure no interference with other operational equipment.

Included in the base contract are; post-award conference, system technical review, documentation, reporting, and meetings as detailed in this section. All requirements are listed as deliverables defined in Section F of the contract.

C.2.2 Standards Compliance

/ All equipment and installation shall conform to all applicable national, state, and local codes and ordinances. The Contractor shall ascertain and advise the Cooperator, on a site by site basis, of the specific codes to which compliance is proposed and shall be responsible for obtaining all required approvals. Although the Government is supplying a representative list of such codes in this the contract, the Contractor shall be responsible for assuring that all required codes are complied with, and shall be liable for all necessary actions to ensure compliance.

This compliance shall include the requirement that the Contractor shall be responsible for obtaining and maintaining any appropriate authorizations and for providing information to the NWS to allow for the timely approval from appropriate agencies (NTIA) for the operation of the required telecommunications systems.

Performance and measurement standards for NWR transmitters shall be in compliance with TIA/EIA Standard 603, except as otherwise stated elsewhere in the SOW or the specification.

C.2.3 Equipment Testing

Testing to be performed shall be comprised of 1) Factory Acceptance (First Article) testing , 2) On Site Acceptance Testing, 3) Operational Acceptance Testing, and 4) Extended Reliability Testing. All testing shall include component

functional tests, environmental tests, and system level tests. The Contractor shall develop and submit detailed test plans and procedures for each type of test to the Government for review and approval in accordance with the requirements of Section F of the contract. Test parameters and specifications for each of these tests is found in Section E of the contract.

The Contractor shall provide for all testing of equipment as detailed below. A test plan and schedule for each of the test phases will be developed and provided to the Government for review and approval prior to commencement of any testing. Detailed test procedures for each of the required types of test shall be submitted for Government approval in accordance with the requirements of Section F of the contract.

The Contractor shall provide a Master Test Schedule that includes the development and review of the test plan, execution of the test, and schedule for providing the test report for all required tests to the Government for review and approval.

Transmitter test measurements shall be in compliance with and performed as described in TIA/EIA Standard 603. Evidence of non-compliance with approved test procedures for any of the above tests shall constitute cause for equipment rejection. In the event of failure or non-compliance during testing the Contractor shall effect corrective measures to the equipment and resubmit for testing. All retesting shall begin at the point where system non-compliance was identified or the failure occurred and proceed from there.

A detailed test plan shall be submitted by the Contractor, to cover the period of

time the new NWR transmitter is operated in demonstration of its capability to provide the required service with specified reliability and availability.

Final Government acceptance of a newly installed NWR transmitter system shall be based on demonstrations of compliance performed by the Contractor in accordance with all provisions of the contract in the presence of a Government inspector.

Upon completion of First Article Acceptance, the Government intends to purchase and retain the test unit(s) for further government testing at the NOAA NWS headquarters facility.

See Section E for detailed information on Inspection and Acceptance.

C.2.4 Training Services

The Contractor shall provide comprehensive training in the operation and maintenance of the transmitters as described in Section C.7. A detailed outline of each proposed training course shall be submitted to the Government for review and approval.

C.2.4.1 System Level Maintenance Training

The Contractor shall present a system maintenance training course(s) at its facility, or at a Government designated site for approximately 25 Government Designated personnel. Selection of the training location will be at the option of

the Government. The course shall cover the theory and operation of the overall system and its equipment components. The course shall also cover at a high level trouble shooting and restoration of service in the event of a failure. The level of the course shall be geared to mid level electronic system managers and training personnel, NWR National Maintenance Contractor personnel, and those responsible for NWR operations at the regional and national level. At the option of the Government, this course shall be made available on an annual basis.

C.2.4.2 Site Level Training

As part of the installation at each NWS site, the Contractor shall train up to 5 site personnel in the operation of the site equipment and instruct them in operational procedures regarding system failures, troubleshooting, restoration to operational status, and preventative maintenance. The students will be government and non-Government technicians who perform maintenance on NWR transmitters.

C.2.4.3 Training Course Outline

The Contractor shall submit for Government approval, as part of the proposal, a complete course outline in sufficient detail to allow verification of the suitability of the proposed training session(s) including proposed duration, qualifications of the instructors, and student profile as related to the level of the training.

Prior to commencement of any installations, the Contractor shall conduct at least one class of the systems level maintenance training course. After beginning, but prior to completion of a site installation and acceptance, the Contractor shall conduct the site level training class for those personnel that the Government

shall designate. The Contractor will be notified of the number of personnel scheduled to attend each class.

Site level training classes for non-Government personnel shall be separately priced and offered at selected Contractor or Government sites at the option of the Government.

C.2.5 Documentation

C.2.5.1 General

Documentation shall be comprised of: 1) a systems manual, 2) a users manual, 3) an equipment manual, 4) site operations manual, 5) training manuals, and 6) procedures for reporting and resolving site operational problems as described in Section F.

C.2.5.2. Systems Manual

The systems manual shall include a detailed overview of the system as a whole as well as providing information and detailed procedures for the day-to-day operation of the Transmitter system as used in the NWR network. It shall include information on configuring, operating, monitoring, safety, troubleshooting, and repair, of the system. It shall also include explanations and instructions for all site level adjustments and user controls as well as system procedures, and a log for recording preventive maintenance and repairs. The level of detail on troubleshooting procedures shall be sufficient to allow on-site

personnel to perform diagnostics procedures and determine whether a system problem requires placing a maintenance trouble call to the Contractor or whether a local problem (e.g., prime power) exists. The manual shall include detailed test equipment requirements and block level diagrams showing each stage/circuit of the system. Details for trouble reporting and escalation procedures, the name and phone number of the person to be contacted, and a place for recording the phone number of the person actually contacted, shall also be included.

C.2.5.3. User Manual

User manuals shall include all information necessary for day to day operation of the equipment on-site.

C.2.5.4 Equipment Manuals

Equipment manuals or sections shall be provided for each type of module provided**.** These manuals shall be detailed and comprehensive, and shall be written to a subsystem level. Information contained shall include equipment description, theory of operation, operating instructions, troubleshooting procedures and charts, illustrated parts replacement instructions, and an illustrated parts breakdown. In the case of Commercial Off the Shelf (COTS) equipment, all standard manuals normally available for the equipment shall be provided. If the COTS manuals, however, do not provide the required information, they shall be supplemented.

C.2.5.5 Training Manuals

Training manuals shall be provided for both levels of training and each participant/student shall receive a copy during training. In addition, one additional training manual shall be provided for each site where equipment is located. Manuals will be provided for each new site, as it comes on line, in the same quantities as mentioned above.

C.2.5.6 Trouble Reporting Procedures

The Contractor shall provide at each site, where the maintenance option has been selected, detailed procedures for trouble reporting, tracking, and escalation, including names and phone numbers of key contacts. The Contractor shall submit these procedures to the Government for review and approval in accordance with the requirements of section F.

C.2.6 Reports

C.2.6.1 General

As a minimum, 4 types of reports shall be required. These are: 1) Progress, 2) Monthly Performance, 3) Quarterly Performance, and 4) Incidence Reports. These reports shall be prepared, delivered, and updated in accordance with the requirements in Section F. A description of the required reports is shown below. All reports shall be provided in hard copy and electronic format. Electronic reports shall be furnished using Wordperfect ver 7 and/or Lotus 1-2-3, rel 5.

C.2.6.2 Progress Reports

Starting from contract award, until the first article is fully assembled, successfully tested and operational, the Contractor shall supply monthly progress reports which shall include a detailed description of work and a tracking milestone schedule.

C.2.6.3 Performance Reports

There shall be two types of performance reports, delivery of which shall commence after the first NWR transmitter site becomes operational, and continue to the end of the warranty period or as long as the maintenance option is in effect.

C.2.6.3.1 Monthly performance Reports

The Contractor shall provide monthly a performance report which shall include, but not be limited to, the following:

(a) availability statistics for all transmitters supplied and in operation, on a monthly basis and on a three month moving average basis.

(b) MTBF/MTTR statistics for each transmitter.

C.2.6.3.2 Quarterly Performance Reports

The second type of report shall be supplied on a quarterly basis. It shall include a compilation of site outages during the quarter, including site, date of occurrence, downtime, and reason for failure.

C.2.6.4 Incidence Reports

During the warranty period, and during the period the maintenance option is in effect, the Contractor shall provide Incidence Reports within three (3) working days of any major failure, i.e., one that impacts the operation of a station. The report shall contain all details of the failure including the exact cause, the remedial action taken to correct it, and the exact time period during which the failure and remedial action occurred including a plan to avoid similar failures in the future.

C.2.7 Meetings

C.2.7.1 General

Meetings shall include, but not be limited to, Post-Award, Monthly Performance, and System Technical Review meetings.

C.2.7.2 Post-award meeting

This meeting will be held at NWS approximately one week after contract award. The agenda will be prepared by NWS, and will include contractual, technical and schedule issues, including laying the groundwork and criteria for performance review and system technical review meetings to follow.

C.2.7.3 Performance Review Meetings

These meetings will take place on a monthly basis until the first article system

is fully developed, tested, implemented, and accepted. The agenda will include, but not necessarily be limited to a detailed review of the methodology and criteria of the performance parameters which are reported, to confirm that they are in conformance with contractual definitions and requirements. In addition, the performance results of the period covered will be reviewed, with an emphasis on the resolution of any problem situations that may have occurred and future prevention thereof.

C.2.7.4 System Technical Review

A System Technical Review will be held as described herein, with the site of the meeting being at the Contractor's facility. The Contractor will present, in detail, the system design for review ***and approval*** of NWS. These meetings will be held in two stages. The Technical Review will take place within **30** calendar days after Contract Award. Within **14** calendar days after this meeting, the Government will indicate its approval or submit comments to the Contractors submittal.

C.2.8 Digital Sub-Carrier Modulation

If tasked by the Government, the Contractor shall, if technologically and economically feasible, provide for dual transmitter modulation capability. The objective is to produce a digital sub-carrier at two data rates; 150 bps for delivering weather information, particularly watches and warnings, to the hearing-impaired community, and 1200 bps in the NWR 25 kHz bandwidth to provide a possible transmission vehicle for the Emergency Managers Weather Information Network (EMWIN). The Contractor shall submit an analysis of the

technical and economic feasibility of such a scheme as part of the proposal.

C.2.9 Logistics Support System (Option 1)

The Contractor shall maintain a logistics and support system to insure availability and timely delivery of parts to the transmitter sites for emergency repairs.

(a) The logistics support system shall be of sufficient size to support the projected transmitter network consistent with the approved ILSP.

(b) The Contractor shall maintain a spare parts inventory in sufficient quantity and at strategic locations such as to meet the MTTR requirements consistent with system availability requirements, and, as a minimum, consistent with MTTR requirements specified in Section C.3. The Contractor shall supply a list of all such spares and depot locations within 60 days ARO.

C.2.10 System Maintenance (Option 2)

The Contractor shall provide system maintenance that satisfies the following minimum requirements:

(a) Provide all equipment and services required to maintain the system at the required performance, reliability, and availability levels for the life of the contract.

(b) Maintain a central toll-free telephone number to receive system trouble calls.

(c) Provide required preventative maintenance on all elements of the system to assure continued system performance.

(d) Insure that personnel are available 24 hours a day, 365 days a year, to receive trouble reports and to take any action required to correct faulty system operation or equipment problems, in a timely fashion consistent with transmitter availability requirements. For planning purposes, maintenance requirements shall be calculated based on three preventative maintenance visits and one trouble call visit per year. See Attachment J.x for additional information concerning maintenance requirements.

C.2.11 System Installation Services (*Option 3*)

The Contractor shall deliver (to the site) and install the NWR transmitters in accordance with Section C.3. The total quantity of transmitters to be purchased and installed is TBD based on availability of funds, both federal and private, for procurement. The Government will provide the Contractor with the locations where transmitters are to be installed as sites are selected and funds become available. This will be done on a task order. A monthly report detailing the schedule of all proposed installations shall be submitted to the NWS. The Contractor shall be responsible for the delivery of all equipment required for the installation to the specified sites. Notification of intent to deliver and install any element of the system shall be given to the

Cooperator and the NWS at least two (2) weeks prior to any planned equipment delivery and installation.

C.2.11.1 Generic Installation Plan

The Contractor shall update the Generic Installation Plan (GIP) to include the most current information for a typical installation of NWS transmitters and ancillary equipment. The Contractor shall provide a list of all allied support requirements for which the Government or Cooperator would normally be responsible. The Contractor shall also provide comprehensive preparatory installation data for the system as part of the GIP. This shall include all pertinent installation conditions and restrictions, such as maximum cable lengths, clearance around cooling vents, access clearances for maintenance and repair, grounding data, power requirements (Voltage, Current, Power), equipment size, weight, etc.

C.2.11.2 Pre-Installation Survey and Report

Pre-installation site surveys shall be conducted to ascertain the suitability of the proposed site for achieving the required NWR coverage, including Radio Frequency Interference studies where required. A detailed site survey report, will be required for each site where NWR equipment is to be installed.

Upon issuance of a transmitter installation task order by the Government, the Contractor shall perform a Pre-Installation Survey on the selected site. Data to be gathered on the survey shall include, but not be limited to, all pertinent installation conditions and restrictions, such as maximum cable lengths, clearance around cooling vents, access clearances for maintenance and

repair, grounding data, power requirements (Voltage, Current, Power), equipment size, weight, etc., and required data for installation preparation. Within 30 days after completion of the Pre-installation Survey, the Contractor shall submit a comprehensive report to the Government for review and approval.

C.2.11.3 Site Installation Plan

Upon approval of the Pre-Installation Survey Report, the Contractor shall develop and submit a Site Installation Plan (SIP) based on the GIP for each proposed site that addresses the conditions, requirements, and restrictions identified during the pre-installation site survey.

The SIP shall include comprehensive site preparatory data to support installation of the system. This shall include the Site Survey Report for the site, including, but not limited to, all pertinent installation instructions and restrictions, equipment layout plans and diagrams, cable lengths and conduit requirements, clearances around cooling vents, access clearances for maintenance and repair, grounding data, power requirements, termination of all circuits, equipment size, weight, etc. The SIP must be approved prior to starting any installation work.

The Contractor shall fully assess the suitability of each facility for NWR equipment installation, and shall provide to the Government four copies of a written (drawings, photos, etc.) recommended installation plan for each specific equipment installation. All assumptions shall be stated. Any work beyond the scope and cost of a generic installation shall be identified for any site where it applies, and a cost estimate provided for approval prior to installation. If the

furnished system includes outdoor equipment to be installed at the sites, the Contractor shall perform a pre-installation site survey of each facility designated to assess its suitability to receive NWR equipment and services.

The Contractor shall be responsible for obtaining all pre-installation approvals and performing any engineering surveys that may be required. This includes required exceptions to zoning requirements; roof or ground level rights and cable way approvals; civil work construction permits; EMI/RFI engineering studies and the submission of information required for updating NTIA frequency allocation databases.

C.2.11.4 System Installation

The Contractor shall not begin any installation work on a transmitter system until notified by the Government that an authorization for the use of any tower and building space is in effect. The Contractor will be issued an "Authorization to Implement" notification from the Government. Upon receipt of "Authorization to Implement" the Contractor shall conduct the Pre-installation Site Survey and begin developing the system design and SIP. Requirements for a Site Survey Report, System Design, and Installation Plan, must also be met prior to commencement of the installation. All necessary site access clearances and construction/installation permits are the responsibility of the Contractor.

All equipment shall be installed by the Contractor in accordance with equipment manufacturer's recommendations, following good engineering practices, and in compliance with any applicable national, state, and local codes.

The Contractor shall have full responsibility for the installation of the NWR

transmitter system. Within 30 days of availability of equipment, the Contractor shall deliver to the site all material, facilities, and services required to install and render the system fully operational such as antenna and transmission line mounting, cabling, connectors, isolators, audio lines within the shelter or building, transmitter venting or air conditioning, lightning protection circuitry, and all power and signal cable connections between the power distribution panels and the transmitters. All installation materials and labor shall be provided by the Contractor, with the single exception that a designated Cooperator or Government site representative may assist in connecting cables between the Contractor's system and site facilities.

Upon successful completion of the installation and acceptance testing an installation completion form shall be given to the Cooperator and approved by the Government inspector.

C.2.11.4.1 Transmitter Shelter

At sites where facilities or sufficient space are not currently available for transmitter installation it will be necessary to construct or provide a transmitter shelter. If tasked by the Government, the Contractor shall provide and install shelters adequate to provide an environmentally stable and secure shelter for the transmitter and all ancillary equipment. The shelter shall be suitable for continuous 24 hour, 365 day a year, operation in the temperature and climatic environment of the selected sites locality. In addition to providing space for the transmitter and ancillary equipment, shelter design must address the requirements for ventilation, cooling, power distribution, audio line feed, antenna transmission cable interface, and grounding. The shelter will provide protection

from weather as well as casual intrusion. Portable or prefabricated shelters may be used. Prior to installation of any such shelter, the design and specifications will be submitted to the Government for review and approval. After approval by the Government, the shelter design may be applied to any subsequent site as long a site conditions do not differ substantially from those taken into account in the original design.

C.2.11.5 Antenna and Transmission Line (*Option 4)*

When tasked by the Government, the Contractor shall provide and install a suitable antenna and transmission line (including all mounting hardware) to complete a transmitter installation. Materials used must comply with NWS requirements for the NWR transmitter network system. To provide for system standardization and network wide compatibility, components proposed must be equivalent to the following: Antennas shall be CELWAVE PD1500-4/PD1500-8, SWR WRX/8 or equivalent. Transmission cable shall be CABLEWAVE or TIMES MICROWAVE RG-338 or equivalent. Proposed equivalent or substitute antennas or transmission cable other than the above makes and part numbers must be submitted to the Government for approval prior to installation.

C.2.12 Warranty

The NWR equipment installed at any NWS or non-NWS facility shall be warranted against faulty design, materials and workmanship for a period of at least one (1) year after receipt and acceptance. Should any defect in the workmanship or materials develop within the warranty period, the defective

part(s) shall be replaced with like part(s) or repaired by the Contractor without expense to the Cooperator or Government. Should any design defect be revealed the Contractor shall rectify the deficiency, retrofit all units previously delivered to the Government and Cooperators.